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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/531,451

04/14/2005

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EXAMINER

WEINSTEIN, LEONARD J

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

07/17/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/531,451	Applicant(s) KAKIUCHI, TAKASHI	
	Examiner LEONARD J. WEINSTEIN	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 29, 2009 has been entered.
2. The examiner acknowledges the amendments to claim 2.

Specification

3. The disclosure is objected to because of the following informalities:
 - a. The following disclosures present language that does not adequately describe the claimed invention:
 - "Piston 120 is positioned on a horizontal extension of balance weight 122." Pg. 5 ll. 6.
 - "in the structure having balance weight 122 disposed on a horizontal extension of piston 120," Pg. 6 ll. 12-13.
 - "in the structure disposing balance weight 122 on a horizontal extension of piston 120," Pg. 7 ll. 11-12.
- App. 10/531451, Pg. 5 ll. 12 - Pg. 6 ll. 9, Specification submitted April 14, 2005. These excerpts have been cited for several reasons. The first is that the use of "horizontal extension" is being used in a manner which suggests that each of a piston and a balance weight have a physical

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component which neither does. A plain reading of the each of the cited statements would lead one of ordinary skill in the art to determine that one or both a piston and/or a balance weight has a physical component that extends horizontally from a piston (or a balance weight) and supports the balance weight (or piston). Second the term has been used inconsistently. The disclosure of page 5 line 6 states an extension extending from a balance weight on which a piston is positioned, and the disclosures on page 6 lines 12-13 and page 7 lines 11-12, state that an extension extends from a piston on which a balance weight is disposed.

To the best of the examiner's understanding it is believed that the applicant was attempting to state that essentially the horizontal bottom surface the balance weight 122 and the top surface of the piston 120 which slides within and under the upper inward facing surface of bore/cylinder formed within the cylinder block 116, overlap one another in a vertical plane. The examiner suggests amending the specification (and claim 1) to include a statement that includes --- wherein a bottom surface of the balance weight lies within a plane which extends horizontally and intersects a piston at a radial location above a central longitudinal axis of the piston and below the outer circumference of the top half of the piston -- - for clarity.

- b. Page 7, line 24 of the original disclosure - reference numeral "133" is used and should be --- 113 ---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-8 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitations of "the x-coordinate and y-coordinate of the portion of the outer circumference of the balance weight closest to the piston are substantially expressed" are not supported by the specification. The examiner notes that these limitations were added in the amendment in the response of April 9, 2008 but were not cited as presenting an issue. After further consideration of the original disclosure, which states "[s]upposing axial center 111a of main shaft body 111 to be origin, coordinates (x, y) of outer circumference of balance weight are expressed" and "the coordinates (x, y) of the outer circumference of balance," it has been determined that neither statement presents a basis for claiming the equations claimed can be used to determine the x and y-coordinates of a point on a balance that is closest to a piston at a given angle of rotation. App. 10/531451, Pg. 5 ll. 12 - Pg. 6 ll. 9, Specification submitted April 14, 2005. This is because the specification discloses that the coordinates of a circumference are determined by the equations but does not

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explicitly state what part, or point, on the circumference is determined. Further there is no disclosure of a portion of the circumference that is closest to the piston stated anywhere in the original disclosure.

6. Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The point on a circumference of a balance weight having the x and y coordinates that can be determined by the equations on page 5, lines 15-25 of the original disclosure, is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

a. The original disclosure, as well as claim 2 of the original disclosure and subsequently claim 1 of the instant application as amended in the response of September 9, 2008, recites/ed that the coordinates of a circumference of a balance weight were "substantially expressed" by the equations:

$$x = [s \cdot \cos(360^\circ - \theta) + L \cdot \cos\{(\sin^{-1}(s \cdot \sin(360^\circ - \theta) / L)\} + C - \alpha] \cdot \cos(360^\circ - \theta)$$
$$y = [s \cdot \cos(360^\circ - \theta) + L \cdot \cos\{(\sin^{-1}(s \cdot \sin(360^\circ - \theta) / L)\} + C - \alpha] \cdot \sin(360^\circ - \theta)$$

The coordinates of a circumference cannot be expressed by equations which provide a single point in a cartesian coordinate system. A circumference is a curve, not a single point. The individual points along the line forming the circumference of a balance weight will have x and y coordinates which will depend on the balance weight's angle of rotation. It cannot be claimed that the equations disclosed can be used to determine the x and y coordinates of at least

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more than one point on the balance weight's circumference given the variables in the equation. As disclosed

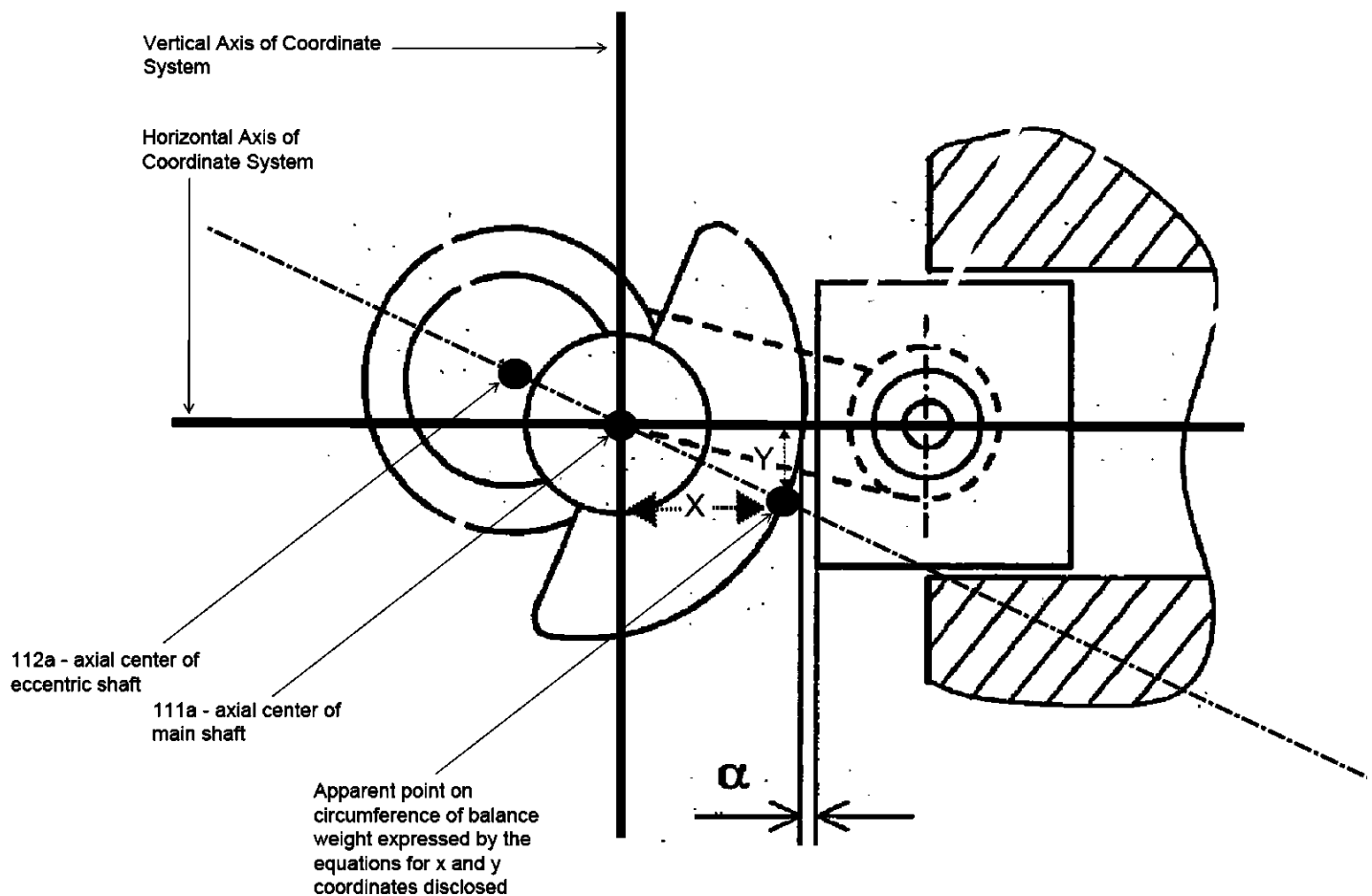
- s is the distance between axial center of main shaft body and axial center of eccentric shaft body,
- L , pitch length of connecting means,
- C , skirt length of piston,
- α , distance between outer circumference of balance weight and piston
- θ , rotation angle of eccentric shaft body

Each of s , L , C , and α , are characteristics of the physical arrangement between a balance weight, eccentric shaft, and piston which do not change as a result of operation. The only variable which changes is the angle of rotation of the eccentric shaft θ but there is no explanation given as to how this angle relates to one or multiple points on the circumference of the balance weight, and there is no variable related to an angular position of any point on the balance weight's circumference. The examiner notes that figures 3 and 4 spatially define all the variables in the equation, but the figures do not show where the point which is expressed by equations for the x and y coordinates is. One of ordinary skill in the art would not be able to determine what portion of an outer circumference was expressed by the equations disclosed and claimed.

b. The claims as amended include the limitation that "the portion of the outer circumference of the balance weight closest to the piston" can be expressed by the equations listed above. This would mean that the equations determined the x and y coordinate of different points of a circumference

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depending on the rotation angle of the eccentric shaft. This would amount to a “floating point” on the circumference of the balance weight. The examiner does not see how this is possible since there is no variable in either equation that is related to an angular position of any point along the circumference of the balance weight. The examiner has concluded, though not certain, that the point given by the equations for x and y , is for the point on the circumference which lies along the same line that passes through both an axial center 111a of the main shaft body 111 and an axial center 112a of the eccentric shaft body 112. The examiner has provided a markup version of figure 3 of the instant application to illustrate this conclusion. The examiner notes however that any explanation of what point



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on circumference was determined by the equations disclosed would be new matter.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 includes the limitations "wherein the piston is positioned on a horizontal extension of the balance weight. As discussed about in reference to the instant disclosure, this limitation claims a physical component that is not part of the invention. There is no horizontal extension of balance weight which a piston is positioned on. As best understood by the examiner, the applicant was attempting to claim the spatial relationship between a piston and a balance weight where the bottom of the balance weight and the outer circumference of a piston above a central longitudinal axis, overlap in a vertical direction. Therefore the limitations of "wherein a piston is positioned on a horizontal extension of the balance weight" will be considered to as --- wherein a bottom surface of the balance weight lies within a plane which extends horizontally and intersects a piston at a radial location above a central longitudinal axis of the piston and below the outer circumference of the top half of the piston --- for the office action on the merits that follows.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 2, 4, 6, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kessler 4,406,590 in view of Turley U.S. 2,838,941. Kessler teaches all the limitations as claimed for a hermetic compressor including: **[claim 2]** an electric motor element 46, a compression element 77 driven by the electric motor element 46, a closed container 27 accommodating the electric motor element 46 and compression element 77, and a refrigerant contained in the closed container 27, the compression element 77 comprising, a shaft (fig. 2) having an eccentric shaft body 190 and a main shaft body 60, a cylinder block 77 having a compression chamber 76, a piston 84 moving reciprocally in the compression chamber 76, connecting means 198 for connecting the piston 84 and the eccentric shaft body 190, and a balance weight 234 formed on the shaft (fig. 2), wherein the piston 84 is positioned on a horizontal extension 192 of the balance weight 234, and wherein the balance weight 234 is formed in such a shape that the distance between the outer circumference of the balance weight 234 and the piston 84 is substantially constant during a period in the rotation of

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the balance weight 234 in which an outer circumference of the balance weight 234 and piston 84 are at their closest proximity, and a subsidiary shaft body 184 formed coaxially with the main shaft body 60, and a subsidiary bearing, element 188 of element 64, for supporting the subsidiary shaft body 184, wherein the balance weight 234 is provided at the end of the eccentric shaft body 190 side of the subsidiary shaft body 184.

Further with respect to claim 2 Kessler teaches a hermetic compressor wherein the axial center of the main shaft body is taken to be the origin; x-coordinate and y-coordinate of outer circumference of the balance weight can substantially be expressed as follows:

$$x = [s \cdot \cos(360^\circ - \theta) + L \cdot \cos\{(\sin^{-1}(s \cdot \sin(360^\circ - \theta) / L)\} + C - \alpha] \cdot \cos(360^\circ - \theta)$$

$$y = [s \cdot \cos(360^\circ - \theta) + L \cdot \cos\{(\sin^{-1}(s \cdot \sin(360^\circ - \theta) / L)\} + C - \alpha] \cdot \sin(360^\circ - \theta)$$

- **Where s is the distance between axial center of main shaft body and axial center of eccentric shaft body,**
- **L , pitch length of connecting means,**
- **C , skirt length of piston,**
- **α , distance between outer circumference of balance weight and piston**
- **θ , rotation angle of eccentric shaft body**

Kessler teaches all the limitations including a hermetic compressor having elements arranged in a configuration as discussed in claim 1. Since Kessler teaches the same

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configuration and the elements as discussed have the same spatial relationship as the instant application, a value for each the variables listed in the x and y coordinate expressions can be determined. Therefore the x and y coordinates of the outer circumference of the balance weight of Kessler (234) can be expressed by the equations as discussed.

Further with respect to claims 4 and 10, the recitation of a balance weight formed by either sinter alloy or press processing of iron plate is considered to be a product-by-process and is not patentable over the balance weight (234) of Kessler. The determination of patentability in a product-by-process claim is based on the product itself, even though the claim may be limited and defined by the process. That is, the product in such a claim is unpatentable if it is the same as or obvious from the product of the prior art, even if the prior product was made by a different process. In re Thorpe, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985). A product-by-process limitation adds no patentable distinction to the claim, and is unpatentable if the claimed product is the same as a product of the prior art.

The compressor of Kessler teaches a balance weight and piston wherein the outer circumference of the balance weight and the bottom of a piston are separated by a constant distance for a least a portion of time when a piston transitions from a suction stroke to a compressor stroke (or when the weight and the piston are closest to one another). There is no explicit teaching provided by Kessler stating that this distance is held constant for the entire period of time in which the balance weight and the piston are closest to one another. Turley teaches a compressor (of an internal combustion engine)

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with a piston 23 reciprocating in a cylinder 22 by a connection to a crankpin 27 of crankshaft 12 with a balance weight 53. Further Turlay teaches that “the counterweights... will clear by a constant amount the lower ends of the pistons 23 when the pistons move below the lower extremities of the cylinder 22.” Turlay teaches a balance weight 53 that is formed in order to obtain the balance weight with a greater inertial force (Turlay – col. 2 ll. 65 – col. 3 ll. 8). Turlay shows that it was known at the time of the invention that a configuration of a balance weight and piston as claimed provides “the greatest possible radius of gyration for the center of mass of counterweight” (Turlay – col. 2 ll. 18-26). This also allows for the center of mass of the counterweight to be distance further from the axis of rotation of a crankshaft. This would increase the moment ($N \cdot m$) of a balance weight about the axis of rotation, and provide for more balanced rotation of the crankshaft especially during a compressor stroke, while also decreasing the amount of counter weighting required. Therefore it would have been obvious to one of ordinary skill in the art to provide a compressor as taught by Kessler with a balance weight on a crankshaft that remained at a constant distance from a piston for the entire time a piston and balance weight were closest to each in order to reduce the degree of counter weighting required for optimal operation (Turlay – col. 2 ll. 18-26).

12. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kessler US 4,406,590 in view of Turlay US 2,838,941. A combination of Kessler and Turlay teaches the general conditions of the claimed invention except for the express disclosure of a distance between an outer circumference of a balance weight and a

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piston is 2 mm or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the distance between outer circumference of a balance weight and a piston 2 mm or less, since the claimed values are merely an optimum or workable range. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

13. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kessler US 4,406,590 in view of Turley US 2,838,941, as applied to claim 1 above, further in view of Nozaki et al. US2004/0057859. A combination of Kessler and Turley teaches all the limitations as discussed but fails to teach the limitation that is taught by Nozaki for a hermetic compressor (fig. 1) wherein the refrigerant is R600a (Nozaki - ¶ 0030). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a natural refrigerant such as isobutene (R600a) as the refrigerant in a hermetic compressor in order to reduce the global warming impacts of the operation of the hermetic compressor (Nozaki - ¶ 0002). It is further noted by the examiner that a recitation with respect to the material intended to be worked upon by a claimed apparatus does not impose any structural limitations upon the claimed apparatus which differentiates it from the prior art apparatus satisfying the structural limitations of the claims, as is the case here.

14. Claims 7-8 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kessler US 4,406,590 in view of Turley US 2,838,941, as applied to claim 1 above, further in view of Hayashi et al. 5,506,486. A combination of Turley and Kessler

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teaches all the limitations as discussed but fails to teach the following limitations that are taught by Hayashi for a hermetic compressor including: an electric motor element 1 driven by an inverter 40 at plural operating frequencies, as shown in figure 13 wherein the solid line shows a relationship between a range of operating frequencies and corresponding operating efficiency of the compressor, including at least an operating frequency of less than the power source frequency (col. 3 ll. 31-35) and at least an operating frequency of less than 30 Hz (fig. 13). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an inverter to drive a motor of a compressor and operate a compressor at a frequency less than a power frequency in order to reduce electric power consumption (Hayashi – col. 59-62).

Response to Arguments

15. Applicant's arguments filed April 29, 2009 have been fully considered but they are not persuasive.

a. The applicant argues that Turlay fails to teach a relationship between the parameters s , L , C , α , and θ as disclosed in the claimed equations of claim 2. The applicant argues that Kessler does not teach the same configuration and elements of claim 2. The applicant further argues that the examiner has not recognized that by using the equations, the parameters s , L , C , α , and θ may be tailored to produce a very small distance between the portion of the outer circumference of the balance weight closest to the piston and the piston.

i. **Response:** The examiner notes that the instant disclosure does not provide a relationship between the equations and how a balance weight is

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produced. It is unclear how the parameters can be tailored to produce a very small distance between the balance weight and the piston because the distance α is a variable that is defined or established prior to operation. The instant disclosure does not adequately link either the operation or the construction of the balance weight to the equations. The x and y coordinates which are determined by the equations are not related to a fixed point on the balance weight per the original disclosure. None of the variables are associated with an angular position of a point along the circumference of the balance weight. There is no disclosure linking where the x and y coordinates are in relationship to the variables s , L , C , α , and θ . Even if the equations could yield the x and y coordinate of a floating point on the outer circumference of a balance weight which was the closer to piston than any other portion of the balance weight, there would be no way to tell where along the outer circumference of the balance weight that point was located. The examiner asserts that the significance of the equations cannot be determined because they produce values that one of ordinary skill in the art could not relate to a physical configuration of a balance weight.

- b. The applicant argues that Turlay teaches the objective of decreasing the weight of the a counterweight and therefore cannot teach the same configuration.

ii. **Response:** The examiner notes that as claimed, the limitations of claim 2 as amended, recite “the balance weight is formed . . . in order to

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obtain the balance weight with a greater inertial force." There is no mention of maximizing the weight of the of the balance weight. The examiner is aware that increasing the weight of balance weight will increase an inertial force of the balance weight but so will moving the center of mass of a rotating object further from an axis of rotation. As disclosed by the instant application "[t]he magnitude of inertial force obtained by rotation of balance weight 122 is proportional to the product of the distance from the axial center 112a of eccentric shaft body 112 to the center of gravity of balance weight 122 and the mass of balance weight 122." App. 10/531451, Pg. 6 ll. 18-21, Specification submitted April 14, 2005. Turley is interested in optimizing the inertial force generated by a balance weight. Turley teaches:

it will be apparent that the inertia effect of the rotation of the metal outside of the circular arc 61 is much greater than the inertia effect resulting from the rotation of any other part of the counterweight 53 of similar weight. In order to gain this advantage from the metal in the counter weights 53 which appear as being outside of the circular arcs indicated at 61, it is proposed to construct the peripheral edge 57 of the counter weights 53 on a line which includes the locus of all points equal in distance from the lower edges of the pistons 23 when the pistons move below the lower extremities of the cylinders 22.

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Turlay US 2,828,941, pg. 2 ll. 69-pg. 3 ll. 8. Turlay teaches moving a center of mass further from an axis of rotation to provide the greatest possible radius of gyration. This will increase the inertial force of the balance weight and therefore reads on the limitations as claimed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEONARD J. WEINSTEIN whose telephone number is (571)272-9961. The examiner can normally be reached on Monday - Thursday 7:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/